

THE DRAFT OF WAGONS.

By Thomas J. Eddy, Secretary of the State Board of Agriculture, read before the Adams County Farmers' Institute.

The draft of an ordinary wagon is more or less influenced by the following items:

1. Height of the wheels.
2. Width of the tire.
3. Angle at which the team is attached.
4. Point to which the team is attached.
5. Distance of the team from the load.
6. Position of the load in the wagon.
7. Character of the road.

Taking these items in the order in which we have given them, and using the results of practical experiments, we arrive at the following conclusions in each case:

HEIGHT OF WHEELS.
A wagon wheel passing over an obstruction brings into use the principle of the lever; the resistance offered by the obstruction is offered on the principle of the inclined plane, and it is to be overcome by the force of the lever which is represented by the spokes of the wheel. The length of the lever is measured by the diameter of the wheel; the longer the lever the easier the obstruction is overcome, and hence the larger the wheel the lighter the draft.

With the wagon standing upon a level floor, the axle of the lower wheel is fore the hind wheel and force the wagon over it by a lift at the outer end of the wheel, using the full diameter of the wheel as the leverage; this makes the same test, with the same obstruction, the difference in the amount of power required to accomplish the result. It will be seen that the greater the difference in the diameter of the wheels, the greater the difference in the amount of power required.

The position in which the least draft is required to move a given load at the horses' point of attachment is when the collar and the ends of the two axles may be joined by one straight line, and the wheels are in a straight line.

It has been found by dynamometer tests that when the front and hind wheels are in a straight line, the draft is considerable, but no more than is required to move the wagon as now constructed, the draft necessary to move the wagon when applied to the hind wheel is found to be less than when applied to the front wheel.

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Nothing On Earth Will MAKE HEADS LIKE
The effect of the attachment of the team to different points on the wagon has been partially illustrated above, but there are some other points to which it may be worth while to call attention.

Prof. Sanborn of the Utah Station, in his report to the difference in the draft of attachment to the wagon and load.

The end of the wagon was reversed, and the horses were attached to the hind wheels. In this test the load was run over an inclined plank road. By this hitch the angle of draft was increased, as the axle of the higher hind wheel stands nearer the height of the horse's shoulder, while the reach that connects the hind wheels with the front wheels dipped at an angle, the reverse of which was the case when the horses were drawn in their natural order.

The difference in results seen below is not the full theoretical difference, for it is difficult to load the pole when the wagon is reversed, so as to run the hind wheels parallel with the front wheels. Nevertheless, there was a decided gain on the reversal of the usual running of the wheels, as the figures show:

Draft on usual hitch, 250 lbs.
Draft on hitch, as tested above, 275 lbs.
Difference of the team from the usual running of the wheels, as the figures show:

In order to make a test of this point the load was alternately placed on the front and back axle, and the resulting draft carefully noted. A load of one ton (weighing with the driver exactly 3000 pounds), was first placed upon the front axle, and a wagon going down an incline, the draft was found to be 2085 pounds (the average of three trials), while when placed on the hind wheels it was found to be 1547 pounds.

Another test on a plank road, the load was placed on the front wheels the draft tributed in the wagon, in the usual manner, it was but 290 pounds. After a number of experiments it was found that the average of all hitches, that on an ordinary road with the load on the front axle there was a loss of 10 per cent. of the draft as compared with a same load on the hind wheels, and a same loss of 8.9 per cent. of the draft when compared with an evenly distributed load.

THE CHARACTER OF THE ROAD BED.
It needs no argument to prove the effect of the road bed upon the draft, and which a team can draw, but the difference in the comparative effect of different road beds is very noticeable. A good road, and practical men vary very much in their estimates; this being the case we can best arrive at results by

taking dynamometer trials as the basis for comparison.

Morning gives the following table as showing the comparative draft on the different kinds of roads named, and the figures in the columns are to be taken as representing the load of one horse:—

On the

Street pavements, dry and clean	120
Street pavements, muddy	250
Good condition, dry, clean and smooth	670
Good condition, muddy with little dirt	1200
Good condition, rutted and muddy	1400
Very bad condition	1800

Best condition..... 2200
Average..... 1200
Newly worked, not muddy..... 1400
Prof. Sanborn, as the result of his own experiments, gives the following as the comparative amounts of draft required on the roads named:

1. Draft of load on sandy and pulverized surface..... 120
2. Draft of load on dry dirt road..... 150
3. Draft of load on partially dried dirt road..... 170
4. Draft of load on worn dirt road partially dried..... 200
5. Draft of load on partially trodden road..... 220
6. Draft of load on good gravel road..... 240
7. Draft of load on worn gravel road..... 260
8. Draft of load on loose gravel road..... 280
9. Draft of load on sandy and pulverized surface..... 120

Prof. Sanborn also compares the following table and thus states his data and theory:

I shall regard 300 pounds as the normal capacity of a pair of horses; this is not their full power but their endurance working power without strain. In this table I shall subtract from the gross amount that this 300 pounds could draw over the several roads and conditions of roads, the weight of wagon and driver, which was, in the trials made, 1300 pounds; to obtain the net load which a pair of horses would draw by the expenditure of 300 pounds over the roads named in the table:

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Our Washington Letter.
WASHINGTON, Feb. 1, 1892.
Editor of the Compiler: The man who says the present House of Representatives is a dis-satisfying body either makes a willful misstatement or is ignorant of the facts, which speak for themselves. The work of the House is far ahead of that of the House of the last Congress at the same period. For instance, it has already passed three appropriation bills—the Budget Deficiency, the Military Academy, and the Indian Affairs—making rapid progress in the consideration of the fourth one—the District of Columbia, while the last appropriation bill was not passed by the House of the last Congress until the first of March.

Besides this, the reporting of three tariff bills as early as the first of March is something unheard of in Congressional history. In a little while it has been done on the floor of the House in the hard work done by the committees, which was never further advanced at this period in any first session. To give a clear idea of how far this work is advanced, Representative Catherin stated that if it were necessary every one of the appropriation bills, except the general revenue bill, is in the hands of the committee. The last one taken up by the committee, could be reported to the House within a few days of being so, the unanimity of the House have proven themselves justifiers, when compared with their Republican predecessors.

The Speaker of the House have been unfortunate in having important legislative plans upset by illness, followed by our winter weather, and the fact that the House had been all arranged that immediately after the reports upon the three tariff bills—free trade, protective and free coinage—should be taken up. The House had been all arranged that immediately after the reports upon the three tariff bills—free trade, protective and free coinage—should be taken up.

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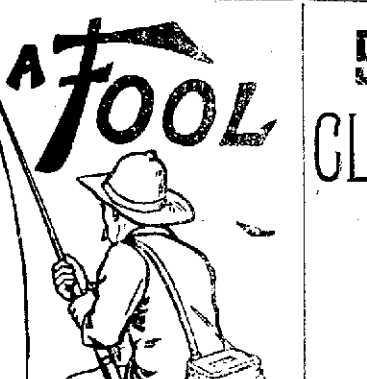
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H. J. STABLE, EDITOR AND PROPRIETOR.

Gettysburg, Tuesday, Mar. 15, 1892.

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